

## **REMARKS**

In the Office Action, the Examiner rejected pending claims 1-5, 8-21, 30-33, and 35-39. By the present Response, Applicant cancelled claims 13-21, 38, and 39 without prejudice. Claims 1-5, 8-12, 30-33, and 35-37 remain pending in the present application. In view of the foregoing amendments and following remarks, Applicant respectfully requests reconsideration and allowance of all pending claims.

### **Claim Rejections under 35 U.S.C. § 112**

The Examiner rejected claims 13-21, 38 and 39 both under 35 U.S.C. § 112, First Paragraph and under 35 U.S.C. § 112, First Paragraph. However, these rejections are moot because Applicants have cancelled the affected claims to facilitate prompt issuance of the present application. However, these claims have been cancelled without prejudice and Applicants reserve the right to re-present these claims.

### **Claim Rejections under 35 U.S.C. § 103(a)**

The Examiner rejected claims 1-5, 8-11, 13-21, 30-33, and 35-39 under 35 U.S.C. § 103(a) as obvious over Lashier et al. (U.S. Patent No. 5,689,028) in view of Alsmeyer et al. (U.S. Patent No. 5,638,172). The Examiner rejected claims 12 and 37 under 35 U.S.C. § 103(a) as being unpatentable over Lashier et al. and Alsmeyer et al. in further view of Tanaka et al. (U.S. Patent No. 5,750,817). Applicants respectfully traverse these rejections.

Independent claim 1 recites “monitoring an *olefin oligomerization* reaction by using low-resolution Raman spectrometry equipment.” (Emphasis added). Independent claim 30 recites “monitoring a *trimerization reaction* by using Raman spectrometry equipment, wherein the Raman spectrometry equipment comprises low resolution Raman spectrometry equipment.” (Emphasis added).

The Examiner’s rejection is insufficient for at least three reasons. First, as acknowledged by the Examiner, Lashier fails to disclose the use of Raman spectroscopy. In addition, Alsmeyer (the secondary reference relied on by the Examiner to teach the use of Raman spectrometry equipment) does not disclose the resolution of the Raman equipment. Even the Examiner has acknowledged this deficiency of Alsmeyer. *See, e.g.*, Office Action Mailed April 11, 2005, page 4. Second, there is no motivation to modify the Lashier system to incorporate use of Raman spectroscopy, much less to incorporate *low-resolution* Raman spectroscopy. Third, the Examiner impermissibly used hindsight in combining the references as alleged.

***1. Features of Independent Claims 1 and 30 Missing from the Cited Combination***

Generally, a low resolution Raman spectrometer has a resolution of greater than about  $8\text{ cm}^{-1}$  while a high resolution Raman spectrometer has a resolution less than about  $8\text{ cm}^{-1}$ . The Examiner has not shown that the Alsmeyer device falls within the category of a low-resolution device. Therefore, the Examiner has not met his burden in demonstrating that the cited combination includes all of the claimed elements.

Accordingly, the Examiner has failed to establish a *prima facie* case of obviousness with regard to independent claims 1 and 30, and their dependent claims.

In formulating the rejection, the Examiner stated that it would have been obvious to use the “appropriate wave lengths” to monitor the Lashier process. *See* Final Office Action, page 4. However, the Examiner misses the point. The selection of “appropriate wave lengths” is limited by the resolution of the Raman spectrometer. In general, resolution is a measure of an instrument’s ability to distinguish between two spectral features that are close together in wavenumber ( $\text{cm}^{-1}$ ). Alternatively stated, the ability to separate and discern the difference between two independent peaks is dependent upon the resolution of a Raman spectrometer. The closer two peaks are to each other in wavenumbers (and the wider the two peaks are in wavenumbers), the higher the resolution of the Raman Spectrometer must be to (1) discern that there are two separate peaks, (2) accurately and reproducibly determine the peak heights (and/or peak areas) of the two peaks, and (3) accurately and reproducibly calculate the concentration of the material(s) represented by the peak based upon the measured peak heights (and/or peak area), and (4) control the process to achieve the desired effect. The higher the resolution of the Raman spectrometer, the easier the achievement of the four tasks listed above. Therefore, the ability to utilize Raman spectroscopy to follow a process is not just a matter of choosing the “appropriate wavelengths” as the process “appropriate wavelength” may not accommodate the simple replacement of a low-resolution Raman spectrometer for a high-resolution Raman spectrometer.

**2. *No Reason to Modify Lashier as Suggested by the Examiner***

The Examiner proposed to modify the Lashier 1-hexene process to incorporate the Alsmeyer Raman device to monitor the conversion of ethylene to 1-hexene. *See, e.g.,* Final Office Action, page 4. However, as discussed in the previous Response, the appropriate peaks for the trimerization of ethylene to 1-hexene include the ethylene and 1-hexene peaks at  $1620\text{ cm}^{-1}$  and  $1640\text{ cm}^{-1}$  respectively. *See* Response to Office Action Mailed April 11, 2005; Specification page 4 lines, 3-12. Because the peaks are so close, one of ordinary skill in the art, without the benefit of the Applicant's disclosure, would dismiss low-resolution Raman spectrometry as being an unacceptable method to monitor and control an ethylene trimerization process.

In summary, not only has the Examiner failed to show that the Alsmeyer reference discloses a low-resolution instrument as claimed, the Examiner has not shown nor explained how the Alsmeyer reference teaches the applicability or the ability to use a low-resolution Raman device in the Lashier process or in the claimed processes. Applicant respectfully submits that that the Examiner has failed to establish a *prima facie* case of obviousness.

**3. *Improper Combination – Impermissible Hindsight***

Apparently, the Examiner believes that because Alsmeyer discloses the use of Raman spectroscopy in a polyester process, the Alsmeyer reference can be paired with any other reference disclosing a different process to render the use of Raman spectroscopy in that different process as obvious. *See* Final Office Action, pages 3-4

(suggesting that use of Raman in Lashier is obvious because “Alsmeyer discloses that the Raman spectrometry has a lots [sic] of advantages for monitoring chemical processes.”). However, Applicant respectfully asserts that the Examiner had no reason to even consider the use of on-line Raman in the Lashier 1-hexene process, other than impermissible hindsight based on Applicant’s disclosure. The Federal Circuit has warned that the Examiner must not “fall victim to the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher.” See *In re Dembiczak* 50 U.S.P.Q. 2d 52 (Fed. Cir.1999). (quoting *W.L. Gore & Assoc., Inc. v. Garlock, Inc.*, 220 U.S.P.Q. 303, 313 (Fed. Cir.1983)); see also *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988) (explaining that one cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention).

Clearly, without the benefit of Applicant’s disclosure, the Examiner (or one of ordinary skill in the art) would not know to employ a Raman device in the 1-hexene process of Lashier, much less understand if use of a Raman device in a 1-hexene process is even feasible. After all, the Alsmeyer polyester process and the Lashier 1-hexene process are very different processes. Further, the demands of Raman spectroscopy are very different in a polyester process than in a 1-hexene process. For example, in the specific case of measuring conversion in Lashier (as suggested by the Examiner), the Raman application is much easier in Alsmeyer because the product is a polymer, a dissimilar component than the polymerization reactants (in contrast to the similarity of the reactant ethylene and the product 1-hexene in Lashier).

The Alsmeyer or Lashier references, whether taken alone or in combination, clearly do not inform one of ordinary skill in the art in the use of low-resolution Raman spectroscopy in a 1-hexene process or similar oligomerization process. For example, Alsmeyer does not teach the capability of differentiating between the Raman peaks of ethylene and 1-hexene, as discussed above. *See* Specification, page 4 lines 3-12. Such a modification of either cited reference would clearly not be obvious. *See* Final Office Action, page 4; Specification, page 4, lines 3-21; page 18, lines 14-34. Applicant respectfully asserts that the Examiner has employed impermissible hindsight in attempting to modify both the Lashier and Alsmeyer references to read on the present claims. *See In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988).

#### ***Request Withdrawal of Rejection***

In view of the deficiencies of the Lashier and Alsmeyer references discussed above, Applicant respectfully requests that the Examiner withdraw the rejection of foregoing claims 1-5, 8-12, 30-33, and 35-37.

#### **Second Rejection under 35 U.S.C. § 103**

The Examiner rejected dependent claims 12 and 37 under 35 U.S.C. 103(a) as being unpatentable over Lashier in view of Alsmeyer, et al., and further in view of Tanaka et al. (U.S. Patent No. 5,750,817). Applicant respectfully traverses this rejection. The Tanaka reference does not obviate the deficiencies of the Alsmeyer and Lashier references discussed above with regard to the independent claims. Therefore,

rejected claims 12 and 37 are believed to be patentable over the cited combination by virtue of their dependency on an allowable base claim and also because of the subject matter they separately recite. Accordingly, Applicant respectfully requests that the Examiner withdraw the rejection of claims 12 and 37 and allow the claims.

### **Conclusion**

In view of the remarks and amendments set forth above, Applicant respectfully requests allowance of claims 1-5, 8-21, 30-33, and 35-39. If the Examiner believes that a telephonic interview will help speed this application toward issuance, the Examiner is invited to contact the undersigned at the telephone number listed below.

### **General Authorization for Extensions of Time**

In accordance with 37 C.F.R. § 1.136, Applicant hereby provides a general authorization to treat this and any future reply requiring an extension of time as incorporating a request thereof. Furthermore, Applicant authorizes the Commissioner to charge the appropriate fee as well as any additional fees which may be currently due to Deposit Account No. 06-1315; Order No. CPCMC:0008/FLE (33938US).

Respectfully submitted,

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Tait R. Swanson  
Registration No. 48,266  
FLETCHER YODER  
P.O. Box 692289  
Houston, TX 77269-2289  
(281) 970-4545